



Evaluation of Alyeska Pipeline Service Company's Project Performance for TAPS

Comprehensive Monitoring Program Report

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Our Message to Stakeholders

Importance of TAPS

The Trans-Alaska Pipeline System (TAPS) transports nearly 20 percent of the nation's domestically produced crude oil through the unique and fragile environment of Alaska. TAPS is critical to the national security, and revenues from crude oil transported by TAPS account for approximately 85 percent of the State of Alaska's general fund. Since start-up in 1977, TAPS has safely transported more than 12 billion barrels of crude oil from Prudhoe Bay to Valdez. The Joint Pipeline Office (JPO), a consortium of six State and five Federal agencies, oversees Alyeska's management of TAPS.

JPO's Comprehensive Monitoring Program

JPO's vision: To work proactively with the oil and gas industry in Alaska to achieve safe operation, environmental protection, and continued transportation of oil and gas in compliance with legal requirements. The JPO Comprehensive Monitoring Program (CMP) is intended to influence continuous improvement in Alyeska's management of TAPS construction, operations and maintenance activities. The JPO CMP process is focused on problem prevention rather than reaction, emergency response, and damage control.

CMP reports periodically communicate to JPO stakeholders summaries of past significant findings, conclusions and recommendations drawn from JPO monitoring efforts. They revisit critical TAPS audit deficiencies; incorporate concerns raised by TAPS employees and outside interest groups; address high risk activities; verify compliance with laws, regulations, permit conditions, and grant/lease stipulations; verify compliance with important internal Alyeska controls such as the quality, safety and environmental programs; and evaluate causal factors and trends related to recent TAPS incidents. Each report covers one of twelve CMP functional topics and addresses a selection of significant issues of concern to JPO and its stakeholders. The twelve CMP functional areas are:

Alaska Native Employment & Training	Environment	Project Performance
Configuration Management	Maintenance	Quality
Employee Concerns Program	Safety	Risk Management
Equal Employment Opportunity	Project Design	Operations

About This Report

The JPO is pleased to present this report on *Alyeska Pipeline Service Company's Project Performance for TAPS* to our stakeholders. As part of the CMP process, JPO evaluated Alyeska's Management Plan to determine the risk potential for TAPS work projects, especially those involving pipeline excavations which have potential for significant consequences. While Alyeska operations and maintenance of

TAPS will never be risk-free, JPO oversight will help minimize environmental risks and maximize compliance with worker safety and pipeline integrity standards.

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Executive Summary

The Joint Pipeline Office (JPO) selected eight 1997 TAPS projects for in-depth review and evaluation. JPO conducted surveillances and assessments and reviewed project documents to reach the following conclusions about Alyeska's project performance:

- Alyeska conducted projects in a manner that minimized risk to the environment and worker safety. As a result of the work done on these projects, the risk to pipeline system integrity has been reduced.
- The pipeline excavation projects were implemented to enhance and protect pipeline system integrity and pipeline safety.
- Improved planning for some TAPS projects would have lessened the risk to pipeline system integrity during projects such as the Tank 140 and Wilber Creek Corrosion Investigations.
- Projects selected for evaluation complied with Stipulation 1.7, *Notices to Proceed* of the Federal Grant and State Lease.
- Alyeska projects had no agency permit violations during 1997.
- The Alaska State Department of Labor issued 124 National Electrical Code (NEC) violations to Alyeska's contractor involving some electrical components of the Marine Tanker Loading Vapor Control project at the Valdez Marine Terminal. The notices of violation required Alyeska to fix components not installed according to the Alaska State Department of Labor's (ADOL) interpretation of NEC requirements. JPO did not believe these violations presented a threat to the safe operation of the Marine Tanker Loading Vapor Control system. The violations were considered to be instances of noncompliance with the Federal Grant and State Lease. Alyeska subsequently corrected the violations, and JPO verified they had been corrected.
- Some projects lacked sufficient project planning, which led to a fragmented construction process and compromised timely completion of the project. For example, the Wilber Creek and Tank 140 projects would have benefited from more thoughtful planning. The other excavation projects JPO reviewed were completed without incident, indicating good project planning.
- Alyeska and JPO surveillances both documented project and quality procedures that were not consistently followed for some Alyeska projects, particularly the Vapor Recovery and Vapor Control and Tank 140 projects. Alyeska should evaluate the root cause to determine if more training, clearer procedures, additional inspections, or increased accountability could improve future project performance.
- Alyeska's response to employee concerns was not timely for project related concerns in 1997, but response time significantly improved in the second quarter of 1998.

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- Significant audit action items identified by audits conducted by Quality Technology Company, Inc., and Arthur D. Little were found to be recurring in some projects:
 - 1) National Electrical Code violations for some electrical components of the Marine Tanker Loading Vapor Control project at the Valdez Marine Terminal; 2) use of untraceable project materials; 3) supplies and materials not receiving quality inspections; and 4) improper inspector certification, an item that has subsequently been resolved and closed.

Conclusion

The pipeline system, workers and environment remained safe, but project planning and execution processes showed need for improvement. Some 1997 projects could have benefited from better project planning, which would have improved construction quality, efficiency and productivity.

Other projects, such as Pump Stations 2 and 6 Ramp Down, Thompson Pass Mainline Pipe Corrosion Investigation, Milepost 799 Mainline Pipe Corrosion Investigation and other repair projects were implemented with thorough planning. These projects were completed on time with minimum controversy and expense.

JPO is convinced that most of the issues cited in this report would have been prevented with a stronger quality assurance program, and that better planning for future projects will strengthen quality assurance. However, Alyeska's implementation of their Quality Assurance Surveillance Program did provide continuous improvement for some projects.

The project planning and compliance issues cited in this report are not severe enough to be individually significant. However, if future CMP reports continue to document similar deficiencies, then substantive concerns of Federal Grant and State Lease compliance would emerge. JPO will continue to document Alyeska's management and execution of projects for future CMP reports.

Chapter 1. Purpose, Background and Scope

Purpose

The Comprehensive Monitoring Program *Project Performance Report* is the fifth in a series of stakeholder reports that look at specific Trans-Alaska Pipeline System (TAPS) operations. This report presents the results of the JPO CMP evaluation of Alyeska Pipeline Service Company's project performance for TAPS. This evaluation was performed to address whether Alyeska has implemented TAPS projects in accordance with approved project plans, designs and regulatory requirements. JPO's conclusions are based on surveillances and assessments from oversight activities.

Monitoring Project Performance

During the development of the CMP in 1994, JPO performed a risk analysis to determine which types of projects posed the most significant risk to pipeline integrity. The risk analysis indicated that projects involving pipeline excavations have significant risk. JPO selected three large excavation projects (photos included in appendix), two pump station ramp down projects, and the installation of stream bank erosion protection structures for project evaluation; and other projects that involved major modifications to maintain pipeline integrity for TAPS.

Scope and Methodology

The scope of this CMP report covers eight large Alyeska projects completed in 1997. JPO evaluated these TAPS projects to determine whether Alyeska's project activities were conducted with:

- Minimum environmental impact
- Conformance to employee safety standards
- Protection of pipeline system integrity
- Compliance with the Federal Agreement and Grant and State Lease of Right-of-Way
- Conformance with approved plans and permits

JPO addressed environmental impacts and employee safety standards in previously released 1998 CMP reports. This report addresses Alyeska's compliance with the Federal Agreement and Grant and State Lease of Right-of-Way and conformance with approved plans and permits. JPO thoroughly reviewed selected project documents, evaluated the outcomes and formed conclusions for each project performance criteria. The scope of this CMP evaluation does not include determining validity of project plan designs. This will be addressed in future CMP reports scheduled for release later in 1998.

1997 TAPS Projects Selected for Review

Projects were chosen for evaluation based on their significance to pipeline integrity and compliance with codes and permits. JPO conducted approximately 30 field surveillances to evaluate the following projects:

1. ***Thompson Pass Mainline Pipe Investigation and Repair.***
This was a large, extensive project that involved the excavation and investigation of a 50-foot section of pipe on the steepest section of the pipeline route at Thompson Pass, 25 miles north of Valdez. Pipe vibrations were occurring in this area as the result of crude oil pressure surges caused by declining oil throughput and steep slope conditions. Some dents and pipe ovality were detected that posed questions of possible weakening or cracking of the metal in the dented areas. Alyeska installed a sleeve on this section of pipeline.
2. ***Cathodic Protection Inspection, Installation, and Repair of Tanks 110 and 140.***
Both projects consisted of draining and inspecting the above ground crude oil relief tanks for corrosion and to ensure the cathodic protection systems were working properly to prevent corrosion. Tank 110 is a relief tank at Pump Station 1 that needed repairs of the tank's cathodic protection system. The project was completed on schedule and without incident. The Tank 140 project at Pump Station 4 was similar in scope to the Tank 110 project until inspections of Tank 140 revealed the tank liner needed replacement. The scope of work was modified and expanded to include a secondary liner replacement under the tank. Tank 140 was then raised above the ground to replace the bedding materials and secondary liner. The tank was hydro-tested in June 1998 before being placed back in service.
3. ***Pump Station 2 Ramp Down.***
Pump Station 2 was ramped down, or isolated for shutdown and removal from TAPS operation. Alyeska conducted several studies to determine the optimum economical configuration of the pipeline and operating pump stations for current and future throughput of oil. The study results indicated that Pump Station 2 was not needed for the movement of oil due to the combination of less oil throughput and the injection of a drag reducing agent into the pipeline. The decision was made to install a drag reducing agent injection facility at Pump Station 1 to speed and smooth oil flow. All modifications to Pump Station 2 were designed for the pump station to be reactivated within 180 days, if necessary.
4. ***Pump Station 6 Ramp Down.***
Alyeska also isolated Pump Station 6 due to the combination of less oil throughput and the addition of a drag reducing agent to speed oil flow. A drag reducing agent injection facility was established at Cold Foot, Pipeline Milepost 238. Pump Station 6 was then isolated and removed from TAPS operation. Like Pump Station 2, all modifications to Pump Station 6 were designed for the pump station to be reactivated within 180 days, if necessary.
5. ***Wilber Creek Pipe Investigation and Repair.***

This project was quite complicated and extensive due to exceptionally deep burial of the pipe and the large extent of pitting and corrosion of the pipe wall. The affected segment of pipe was 9 miles north of Pump Station 7, south of Wilber Creek. The work scope included excavating, cleaning and inspecting the pipe, installing a pipe sleeve, repairing pipe coating and cathodic protection systems, and backfilling and restoring the site. The steep grade and unstable nature of the bedding materials presented complications throughout the project. JPO monitored this project from the design review phase through project closeout, and evaluated contractor services, quality assurance, compliance, and project supervision.

6. ***Dietrich River Revetment.***

Stream bank erosion jeopardized support for a portion of above ground pipeline along the Dietrich River. Alyeska installed 800 lineal feet of rock riprap to reinforce pipe support and protect the river bank from the erosive forces of the river.

7. ***Valdez Marine Terminal Vapor Recovery and Control Projects.***

Work was completed in 1997 for two extensive \$100 million vapor recovery and control projects at the Valdez Marine Terminal: 1) The Storage Tank Vapor Recovery System project examined and replaced corroded carbon steel pipe with new corrosion resistant stainless steel pipe in the existing vapor recovery system at the tank farms, and 2) The Marine Tanker Loading Vapor Control project involved the installation of a new vapor control system on berths 4 and 5 at the Valdez Marine Terminal. This project was initiated to meet new statutory requirements. The Storage Tank Vapor Recovery and Marine Tanker Loading Vapor Control systems operate in an integrated and coordinated way to recover vapors at the Terminal. The purpose of the Marine Tanker Loading Vapor Control project was to implement a system to collect, recover and dispose of the crude oil vapors at the VMT in a safe and environmentally responsible manner. The scope of work for this project included the design, procurement, installation, and commissioning of the new system.

8. ***Pipeline Milepost 799, Allison Creek Corrosion Investigation and Repair.***

This project was part of Alyeska's Corrosion Monitoring Program and involved the excavation of the mainline pipe at Allison Creek, the pipeline entrance to the Valdez Marine Terminal. This investigation was initiated because pipe ovality and corrosion anomalies were detected by a smart pig run. Alyeska installed a repair sleeve for this section of pipeline.

How This Report is Organized

This report does not tell a project-by-project story, rather it is organized to discuss specific issues JPO feels are important. By structuring the report this way, JPO takes a broad look at overall project performance by guiding the reader through a discussion of key items of concern. As part of the CMP process, JPO searches for overall trends in project performance that may result over time.

Some projects had favorable reviews and Alyeska is commended for the good work on those projects. The projects with less favorable reviews were evaluated to identify ways to improve future performance for similar projects. Photos of larger projects, such as the Thompson Pass and Wilber Creek Mainline Pipe Investigation and Repair, and the Vapor Recovery and Control System projects at the Valdez Marine Terminal are included in the appendix.

CMP Project Performance Information Sources

JPO evaluated projects based on information from the following sources:

- JPO and Alyeska Employee Concerns Program data bases.
- JPO surveillance, assessment, and audit action item data bases.
- Alyeska's surveillance data base.
- Memos and letters between Alyeska and the Joint Pipeline Office.
- JPO interoffice memos and engineering reports.
- JPO's Notice To Proceed files.
- Construction project packages issued for approval and construction.

Chapter 2. JPO's Focus: Environmental Impacts, Worker Safety, and Pipeline System Integrity

- Alyeska conducted projects in a manner that minimized risk to the environment and worker safety. As a result of the work done on these projects, the risk to pipeline system integrity has been reduced.
- The pipeline excavation projects were implemented to enhance and protect pipeline system integrity and pipeline safety.
- Improved planning for some TAPS projects would have lessened the risk to pipeline system integrity during projects such as the Tank 140 and Wilber Creek Corrosion Investigations.

Environmental Risks

The Joint Pipeline Office March 1998 CMP report, *Alyeska Pipeline Service Company's TAPS Environmental Protection Program*, addressed the environmental impacts associated with the execution of high risk major maintenance projects. High risk TAPS activities consist of

construction or major maintenance projects or changes in operations which could increase the chance of directly damaging the pipeline or related facilities. Three projects considered to be high risk in JPO's March 1998 *CMP Environmental Protection Program Report* were: 1) Wilber Creek Mainline Pipe Investigation and Repair, 2) Thompson Pass Mainline Pipe Investigation and Repair, and 3) Vapor Recovery and Vapor Control System projects at the Valdez Marine Terminal. JPO evaluated Alyeska's performance of these projects for compliance with the Federal Grant and State Lease, compliance with quality requirements and how these projects affected pipeline integrity.

The *Environmental Protection Program Report* concluded that Alyeska planned and executed major projects in a satisfactory manner with a high degree of oversight that protected the environment. This was accomplished by the presence of Alyeska and contractor field environmental generalists at project sites. Areas where performance needed improvement included lack of contractor environmental briefings and environment team involvement in project closeout. These issues were discussed in the previously released *CMP Environmental Protection Program Report*. While these discrepancies were considered significant, JPO concluded that Alyeska's environmental protection was successful in project performance.

Since the release of JPO's *CMP Environmental Protection Program Report*, one environmental issue surfaced concerning environmental impacts of projects. During the ramp down of Pump Station 6, Alyeska discovered a historic fuel spill. Alyeska determined this spill location was a diesel refueling area during pipeline construction in the 1970s. The site was entered in the company Contaminated Sites Program record and a site characterization is planned for summer, 1998. JPO plans to monitor the characterization work to track any potential problems.

Employee Safety on TAPS Projects

The Joint Pipeline Office CMP Report, *Evaluation of Alyeska's TAPS Employee Safety Program* addressed worker safety on TAPS projects. The report stated JPO found satisfactory safety conditions on Alyeska's excavation projects, most notably the Wilber Creek and Thompson Pass Pipeline Corrosion Investigations. JPO concluded that Alyeska has a sound personnel safety program that minimizes risk to personnel on TAPS work projects.

Pipeline System Integrity

Excavation Projects for Pipeline Investigation and Repair.

During the development of the Comprehensive Monitoring Program (CMP) in 1994, JPO completed a risk analysis to see which kinds of projects posed significant risk to pipeline integrity. The analysis indicated pipeline excavation projects posed a significant amount of risk.

JPO selected three high risk projects to evaluate for 1997 pipeline excavation work. Of the eight projects JPO evaluated, three involved excavating the mainline pipe for the purpose of investigating and repairing corroded pipe: 1) Thompson Pass Mainline Pipe Investigation, 2) Wilber Creek Mainline Pipe Investigation, and 3) Pipeline Milepost 799, the Allison Creek Corrosion Investigation. During implementation of these three excavation projects, JPO noted the TAPS Operations Control Center (OCC) and Alyeska contractors maintained close communication to protect the integrity of excavated portions of the pipeline.

Both JPO and Alyeska surveillances indicated project staff followed excavation procedures according to Alyeska's TAPS *Maintenance and Repair Manual* (MR-48). JPO surveillance found the excavation attributes to be satisfactory and without findings concerning unsafe excavation procedures. No incidents occurred that had negative affects on pipeline safety. This was a difficult task for the Thompson Pass and Wilber Creek project staffs, because of the complicated excavation process. JPO documentation indicated project staff completed pipeline excavation activities in a safe and conscientious manner. Photos of the Wilber Creek and Thompson Pass Mainline Pipe excavations are included in the report appendix.

Tank 140 Cathodic Protection Repair and Installation.

Routine maintenance for Tank 140, Pump Station 4 consisted of draining and inspecting the above ground crude oil relief tank for corrosion and cathodic protection. (Cathodic protection is the system of protecting the tank metal from corrosion by applying an electric current to the metal and installing decoy metals to attract corrosive elements). Project staff expanded and modified the original work scope to replace the secondary liner under the tank.

JPO was concerned about the protection of pipeline system integrity during the secondary liner repair work. The planning process became fragmented, resulting in several work delays as the project progressed. The tank was lifted off the ground to replace the liner and bedding material. While the tank remained lifted above ground, work delays left the thin wall of the tank exposed to possible damage 53 days, during sometimes windy conditions. Once the tank was lowered, inspections revealed that no damage had occurred to the tank wall. The tank was hydro-tested in June 1998 with positive results and has subsequently been placed back in service.

Pump Station 6 Ramp Down.

One operational incident occurred during the ramp down of Pump Station 6. The event occurred when a section of pipe was drained upstream of the pump station during a planned July 1997, mini-shutdown. When shutdown activities were completed, the drained section of pipe rapidly filled with pressurized crude oil, which then collapsed a vapor bubble that had formed. The bubble created an internal pressure surge, resulting in a large vibration in the main pipe. In assessing the Pump Station 6 ramp down process, JPO concluded no damage occurred to the pipeline during this event. The incident will be addressed and further evaluated from an operations standpoint in the CMP Operations report, which will be released later in 1998.

Chapter 3. Compliance With the Federal Agreement and Grant and State Lease of Right-of-Way

- Projects selected for evaluation complied with Stipulation 1.7, *Notices to Proceed* of the Federal Grant and State Lease.
- Alyeska projects had no agency permit violations during 1997.
- Some projects lacked sufficient project planning, which led to a fragmented construction process and compromised timely completion of the project. For example, the Wilber Creek and Tank 140 projects would have benefited from more thoughtful planning. The other excavation projects JPO reviewed were completed without incident, indicating good project planning.
- Alyeska and JPO surveillance both found that project and quality procedures were not consistently followed for some Alyeska projects, particularly the Vapor Recovery and Vapor Control and Tank 140 projects. Alyeska should evaluate the root cause to determine if more training, clearer procedures, additional inspections, or increased accountability would improve project performance.
- The Alaska State Department of Labor issued 124 National Electrical Code (NEC) violations to Alyeska's contractor involving some electrical components of the Marine Tanker Loading Vapor Control project at the Valdez Marine Terminal. The notices of violation required Alyeska to fix components not installed according to the Alaska State Department of Labor's (ADOL) interpretation of NEC requirements. JPO did not believe these violations presented a threat to the safe operation of the Marine Tanker Loading Vapor Control system. The violations were considered to be instances of noncompliance with the Federal Grant and State Lease. Alyeska subsequently corrected the violations, and JPO verified they had been corrected.

Codes, Regulations, and Grant/Lease Stipulations

Valdez Marine Terminal Vapor Recovery and Control Projects.

Work was completed in 1997 for two extensive \$100 million vapor recovery and control projects at the Valdez Marine Terminal: 1) The Storage Tank Vapor Recovery System project examined and replaced corroded carbon steel pipe with new corrosion resistant stainless steel pipe in the existing vapor recovery system at the tank farms, and 2) The Marine Tanker Loading Vapor Control project involved the installation of a new vapor control system on berths 4 and 5 at the Valdez Marine Terminal. The Marine Tanker Loading Vapor Control System project was initiated to meet new statutory requirements. The Storage Tank Vapor Recovery and Marine Tanker Loading Vapor Control systems operate in an integrated and coordinated way to recover hydrocarbon vapors at the Terminal.

VMT Storage Tank Vapor Recovery System Pipe Replacement Project.

A Storage Tank Vapor Recovery System has been in place at the Valdez Marine Terminal

(VMT) tank farm since oil was first transported through TAPS. The vapor recovery system for crude oil storage tanks was part of the original design and construction of the VMT. The purpose of this system is to balance vapors in the space created in storage tanks as crude oil is emptied from the storage tanks to fill tankers. The system was upgraded in 1981 to incorporate vapor balancing between tanks which reduced emissions.

In January 1995, JPO began receiving reports of pipe integrity problems associated with this system. Leaks were detected resulting from pipe corrosion at the tank farm. Alyeska initiated a rigorous testing program to identify all leak-susceptible areas and decided to replace the corroded pipe with corrosion resistant stainless steel. Alyeska also made other modifications for compressors, coolers, scrubbers, incinerators, and other important components.

Marine Tanker Loading Vapor Control System Installation at the VMT.

Recent amendments to the Clean Air Act of 1990 required an additional vapor recovery and control system be installed on the berths at the VMT by March 19, 1998. The Marine Tanker Loading Vapor Control System was an extensive project initiated to meet the new U.S. Environmental Protection Agency Marine Tank Vessel loading regulations that require the capture of crude oil vapors when loading tankers. The system is designed to reduce emissions of hazardous air pollutants from crude oil vapors by capturing hydrocarbon vapors released from crude oil as it flows into the tanker holds. Captured vapors are sent to any one of three areas: 1) vapor is converted to blanket gas and routed to tank farm storage tanks to balance vapor pressure in the storage tanks; 2) some vapor is used to supplement fuel for the VMT powerhouse boilers to generate electricity, and 3) vapor not needed for balance or fuel is routed to the incinerator (photos included in appendix).

The Alaska State Department of Labor (ADOL) issued 124 National Electrical Code (NEC) notices of violation to Alyeska's contractor for some of the electrical installation work at berths 4 and 5 of the Marine Tanker Loading Vapor Control System at the Terminal. ADOL determined that some components of the electrical work did not comply with the NEC, the code used for inspecting new construction facilities and modifying existing electrical systems. Alyeska agreed to fix those components not installed according to the NEC requirements, as required by ADOL.

Since all TAPS projects are required to meet codes specified by the Federal Agreement and Grant of Right-of-Way, JPO considered the NEC violations to be instances of noncompliance with the Federal Grant until they were subsequently corrected. Considering that no system of this nature is risk free, JPO did not believe these violations presented a threat to the safe operation of the Marine Tanker Loading Vapor Control system. Although the system experienced some past operational problems, JPO did not equate these problems with the safe operation of the system.

The violations have subsequently been resolved and JPO verified the correction of those electrical components that ADOL determined did not meet NEC requirements.

In June 1998, JPO completed field work for a system-wide assessment of electrical alterations and installations to ensure that all required procedures were followed for TAPS electrical work. JPO assessed whether Alyeska obtained the correct work permits, properly processed work orders, and hired licensed qualified personnel to do the work. JPO completed this assessment in

August 1998 and the outcome will be discussed in the *CMP Maintenance Report*, scheduled for release later this year.

Wilber Creek Corrosion Investigation Project.

During the pipeline investigation project at Wilber Creek, a code violation occurred concerning the welding procedure used to attach monitoring rods to the pipeline. Monitoring rods indicate settlement of the pipe after burial. The rods are attached to the pipeline with bolts welded to the pipe. The welding procedure consists of a thermitic weld typically used for attaching cathodic protection wiring and other appurtenances to the pipeline. The American Society of Mechanical Engineers, Code B31.4 specifies that a 15-gram maximum thermitic charge be used when attaching cathodic protection wiring to the pipeline. The purpose of limiting the grams for the thermitic charge is to minimize stress and cracking of the pipe metal. Alyeska used a higher charge of 25-grams to weld the monitoring rods to the pipe. JPO is concerned about the higher gram charge because the higher the charge, the more heat increases, which can weaken the pipe wall and negatively affect pipeline integrity.

In August 1998, Alyeska developed a testing plan to determine the effect of using the higher 25-gram thermitic charge on the pipe wall. The company plans to complete testing by the end of September 1998, and will submit the final test report to JPO as soon as it is available. JPO will evaluate the test results to see how the 25-gram thermitic charge welding procedure affects pipe wall strength.

Notices to Proceed

Of the eight Alyeska projects JPO reviewed, the Dietrich River Revetment was the only one that required a Notice to Proceed, the official approval document issued by the JPO Authorized Officer permitting Alyeska to begin construction on TAPS projects. Notices to Proceed are required for some, but not all projects, according to Stipulation 1.7 of the Federal Agreement and Grant of Right-of-Way. The Authorized Officer issues a Notice to Proceed when the design, construction and operation proposals conform to the provisions of the stipulations of the Federal Grant. Project staff followed all Federal Grant stipulations during this project's construction, including the timely submittal of as-built plans to the Joint Pipeline Office.

Conformance to Approved Permits

Alyeska obtained all required State and Federal permits for the projects JPO reviewed, and none of the projects had permit violations.

Project Planning

Conformance to Plans. Section 9 and Stipulation 3.2 of the Federal Grant and State Lease specifies that Alyeska shall plan projects with enough appropriate detail to ensure that construction is technically prudent. Sufficient planning is essential for the successful completion of any large project. JPO reviewed selected Alyeska projects during 1997 to evaluate project planning processes.

The first 1997 project JPO observed was the Wilber Creek Corrosion Investigation project. The project purpose was to resolve corrosion, curvature and ovality anomalies on the mainline pipe at Pipeline Milepost 405. The project scope included excavating, cleaning and inspecting the pipe, installing a sleeve, (a section of one-half inch thick pipe welded on and around the pipeline) repairing pipe coating and cathodic protection systems, and restoring the site.

Field Action Requests (FAR). Before project construction on the Wilber Creek project, JPO discovered that a repair contingency design wasn't included in the project plan. During construction, details for a pipeline repair were added to the project plans using a FAR, which is the process for modifying project plans. (Alyeska uses a FAR to clarify an item or address an oversight or omission in the original project plans). The FAR contained generic, rather than project-specific layout plans and lacked the complete engineering design Alyeska normally requires for this type of repair. Since the sleeve was designed as it was being built, it did not receive a peer review and scrutiny according to the design procedures specified by PM 2001, Alyeska's *Engineering Execution Manual*. Using a FAR to add this large, substantial work item precluded JPO's review of the design. When JPO first began project surveillances, some disagreements occurred between Price AHTNA, Alyeska's contractor and JPO staff about the relevance of and compliance with quality requirements. This situation was discussed in a formal meeting between Alyeska, JPO and Alyeska's contractor. Alyeska then issued a stop work order until project requirements were clarified with the contractor.

When the Wilber Creek project ended, JPO developed a single point of contact list for all projects requiring NTPs and for other projects JPO was closely monitoring. In many cases, Alyeska did not submit project packages with enough lead time for JPO to develop monitoring checklists.

After completion of the Wilber Creek project, Alyeska's Quality Group addressed the concern that substantial work items were being added to project plans after construction had begun. Alyeska's July 2, 1997, memo, *Subject Design Authority Review of Engineering Modification Design Packages* states:

“FARs have been used to add documents to modification packages that should have been in the package prior to release. This is unacceptable. Releasing packages to meet a schedule and filling in missing parts with FARs is abusing the intent of the Quality Program.”

In addition, the July 2, 1997, memorandum provided a detailed list of documentation required when additional scope is added to a project. This documentation should be completed before construction begins. The memo also states:

“FARs which add scope to a package, that is, add work not specifically addressed in the detailed scope of work of the modification package, shall have attached all documents, either new or revisions of those already in the package, necessary to cover the new scope of work. These shall include but are not limited to, as applicable:

- X Detailed engineering and design checklists.
- X Drawings.
- X Specifications.
- X Calculations, including checks.
- X Welding instructions.
- X Implementation instructions or procedures.
- X Test procedures.
- X Completions/turnover checklists.
- X Seismic reviews.
- X Peer reviews.”

Alyeska’s use of field action requests during other pipeline corrosion investigations decreased as work during the year progressed, reflecting improved project planning. Wilber Creek, the first corrosion investigation project evaluated by the Joint Pipeline Office for 1997, resulted in 28 field action requests. Thirteen of these requests were initiated to change the design of the project. The subsequent Thompson Pass corrosion investigation and repair project resulted in 11 field action requests, all initiated for design changes. Only three field action requests were initiated during the corrosion investigation project at Pipeline Milepost 799 later in the year. Since Thompson Pass, Wilber Creek, and Pipeline Milepost 799 projects all had similar work scopes and each successive corrosion investigation project required fewer field action requests, JPO concluded that Alyeska’s project planning progressively improved.

Cathodic Protection Inspection, Installation, and Repair of Tanks 110 and 140.

Both of these projects had similar work scopes, consisting of draining and inspecting the above ground crude oil relief tanks for corrosion, and to check that cathodic protection systems were properly working to prevent corrosion. Alyeska repaired the cathodic protection system for Tank 110, a relief tank at Pump Station 1. The work was completed, using 59 field action requests. The project scope remained unchanged and the project was completed on schedule and without incident.

The Tank 140 project progressed differently. When inspections of Tank 140 revealed the underlying tank liner needed replacing, the project scope changed. The secondary liner was in poor condition from improper bedding materials originally used in construction. The work scope was modified and expanded to include replacement of the bedding and secondary containment liner, and to install a concrete ring wall. Tank 140 was raised above the ground to replace the underlying bedding materials and secondary liner. Project delays exposed the tank walls to a potential risk of damage while the tank remained lifted several feet above the ground for 53 days during sometimes windy conditions. After the secondary liner bedding and replacement work was finished, the tank was lowered down to its normal position. Alyeska initiated a total of 61 field action requests to do the additional work. The work progressed in a fragmented manner, not as a complete package as specified by Alyeska’s July 2, 1997, memorandum. Alyeska

delayed some phases of the project until the design and quality issues were resolved and the resulting field action request was issued. JPO will continue to monitor Alyeska's projects to assess whether there is a trend of using field action requests instead of sufficient project planning.

Quality Procedures

Surveillances and Findings. During 1997, Alyeska's Quality Assurance Group issued seven surveillances from eight reviewed projects. The seven surveillances produced 14 findings related to project implementation and quality. Alyeska closed 13 of these findings. Two findings were recurring audit action items identified by the BLM and Alyeska audit findings from 1994-1995; one of the recurring audit items was the use of untraceable materials for the Thompson Pass corrosion investigation project. (Untraceable materials are already stocked items used for projects that do not have procurement quality control documentation). This posed questions about the quality of the materials being used for the Thompson Pass Corrosion Investigation project.

Another Alyeska surveillance finding that repeats an audit item was the use of uncertified quality control inspectors on the Thompson Pass cathodic protection installation project. This finding is a recurrence of an audit finding that stated:

Procedures for the qualification and certification of inspection personnel have not been developed, implemented, or maintained by the Manager, Quality Service Department, contrary to the requirements of the Quality Program Manual, QA-36.

Alyeska subsequently required all cathodic protection inspectors receive Cathodic Protection Inspection (C.P. 201) Task Specific Training before conducting inspections. A July 1998, JPO surveillance verified that cathodic protection inspectors were being trained, qualified and certified for later projects, satisfying Section 9 of the Federal Grant requirement, *Construction Plans and Quality Assurance Program*. This surveillance attribute was satisfactory and the finding was closed.

JPO conducted 27 field surveillances of selected projects in 1997. The surveillances contained 141 quality procedure attributes, with 18 being unsatisfactory, a 12% failure rate. Alyeska corrected half of the eighteen unsatisfactory attributes on the spot. JPO is concerned about any failure to follow the quality program and will continue to track TAPS projects to look for continuous improvement of Alyeska's Quality Program.

JPO included the 27 surveillances in assessment reports for the *Thompson Pass Corrosion Investigation, Wilber Creek Corrosion Investigation, Pump Stations 2 and 6 Ramp Down, and the Valdez Marine Terminal Vapor Recovery and Control Projects*. These assessments and surveillances revealed five findings related to project implementation. Three of the findings are related to JPO's assessment on the Valdez Marine Terminal vapor recovery and vapor control system. JPO's May 1998 TAPS Assessment Report, *An Evaluation of the Valdez Marine Terminal Vapor Recovery and Vapor Control* project resulted in three findings: 1) construction supplies and materials arriving at the Valdez Marine Terminal were not formally inspected for quality as they were received, nor were they formally inspected by the vendor before transport;

2) field action requests and nonconformance reports were misused; and 3) environmental and safety briefings were not conducted in compliance with Alyeska and project requirements. The first two findings were quality related and considered failures of Alyeska's quality program. Alyeska responded to JPO's assessment report with corrective action plans for the first and third findings. The corrective action for the first finding proposed revising the requirements for radiographic examination so inspections are spread across a greater representative section of the material being fabricated. The corrective action for the third finding involves EN-43, Alyeska's Environmental Manual. Alyeska agreed that not all project personnel were provided a job specific environmental briefing. The company plans to revise the manual to better define the scope of environmental briefing requirements for projects. JPO received the corrective action plan for the second finding, the misuse of field action requests and non-conformance reports and is reviewing the plan to determine whether the plan will resolve the finding.

Another quality issue that is a finding from the JPO TAPS assessment report, *The Mainline Pipe Investigation Project at Thompson Pass*, paralleled Alyeska's finding concerning the use of uncertified quality control inspectors for cathodic protection installation projects. JPO surveillance revealed a finding where the CTI inspector who performed the cathodic protection installation inspections was not certified to inspect cathodic protection. Alyeska responded to this finding by developing a cathodic protection task specific training program. All cathodic protection inspectors must now obtain this training before being certified to inspect cathodic protection installation work. This finding was closed.

Some 1997 projects would have benefited from better project planning. Other projects such as the pump station ramp downs, Thompson Pass and Pipeline Milepost 799 corrosion investigation and repair projects were implemented with thorough planning. These projects were completed on time with minimum controversy and expense. Alyeska's implementation of their Quality Assurance Surveillance Program provided continuous improvement for some projects.

Chapter 4. Employee Concerns and Audit Item Resolution

The Employee Concerns Resolution Program

An employee concern is a statement or assertion of impropriety or inadequacy associated with the construction, operation, maintenance or management of TAPS and affects the quality, safety, environmental protection, and pipeline integrity of TAPS.

A critical part of JPO's oversight is to ensure that employees of Alyeska Pipeline Service Company or employees of Alyeska's contractors can voice their concerns about technical and business practices in an atmosphere which promotes free and open communications.

Alyeska established the employee concerns program to investigate, resolve and document employee concerns that were not otherwise being resolved. The program is available to all people working on TAPS, including Alyeska and contractor management, supervisors and employees and other interested persons. Alyeska has several avenues for the expression of employee concerns. Employee concerns should be promptly investigated to gather and analyze facts to determine a course of future action.

The Joint Pipeline Office established a toll-free telephone hotline for the anonymous reporting of concerns. JPO staff includes an Employee Concerns Specialist to assist employees in resolving their concerns and provides information and guidance on available resources.

Employee Concerns Relating to Project Performance

- Alyeska's response to employee concerns was not timely for project related concerns in 1997, but response time significantly improved in the second quarter of 1998.

Two employee concerns were filed with the JPO Concerns Resolution Program during the Valdez Marine Terminal Tanker Vapor Control and Recovery Project. JPO received the first concern February 1997, regarding issues pertaining to inspectors: 1) possible conflict of interest with inspectors, 2) whether the number of inspectors assigned was adequate for in-process welding inspections, and 3) vendor inspection requirements and how received materials were being inspected. JPO investigated the concern and did not substantiate it. Alyeska sent JPO a response in June 1997, resolving this concern. However, the time it took to complete this employee concern investigation exceeded the 30-45 day time frame specified by Alyeska to process concerns.

A second employee concern was submitted to JPO March 1997, by an Alyeska contract employee, the result of an Alyeska surveillance. This concern resulted in four findings of failure to follow proper inspection procedures and improper inspection documentation for some projects. JPO referred this case to Alyeska. The investigation took over a year to complete, also

exceeding the normal 30-45 day time frame for completing an employee concerns investigation. The employee concern took so long to process that a different contractor was in place by the time the investigation ended. Alyeska validated the employee concern, substantiated that the concerned individual had experienced retaliation, and identified a corrective action plan. JPO has requested a current status report on these employee concerns and is expecting information from Alyeska on what remains to be accomplished in order to bring closure to these concerns. JPO expects Alyeska's certification of closure in the near future, stating a plan has been implemented. JPO will track this case until closure.

TAPS concerns unrelated to project performance in 1997 were also not being processed in a timely manner by Alyeska's Employee Concerns Program. As of February 1998, 37% of all open concerns exceeded 120 days. The average processing time for employee concerns was 107 days. However, in 1998, Alyeska's timeliness of processing concerns has improved. In the first two quarters of 1998, Alyeska made a significant improvement in the timely processing of employee concerns. As of May 1998, no active concerns exceeded 120 days, with an average processing time of 32 days.

JPO believes the timeliness of investigating and processing employee concerns is important to the credibility of the Employee Concerns Resolution Program. In JPO's estimation, employee concerns that are not handled with a sense of immediacy weaken the credibility of the Employee Concerns Resolution Program. JPO is especially concerned about slow response times for concerns that are project related because of the fast pace and temporary nature of TAPS projects. In the past, Alyeska has not tracked concerns by individual work projects, which makes it difficult to identify trends. JPO plans to work with Alyeska to track employee concerns by specific projects, to identify trends that are project specific.

Audit Action Items

TAPS Audits

In 1993, BLM contracted with Quality Technology Company to conduct an audit of TAPS operations and maintenance. This audit, which was inspired by testimony of TAPS whistle blowers at Congressional oversight hearings, uncovered numerous systemic deficiencies including:

- an ineffective Alyeska quality program;
- questionable electric code compliance; and
- a pipeline that, after 17 years of accumulative modifications, could no longer be proven that it would withstand major earthquakes or other rare but possible contingencies.

The TAPS Owners contracted with Arthur D. Little and essentially validated the BLM audit as well as identifying many more specific deficiencies. These audit deficiencies did not typically involve non-compliance technical or environmental stipulations of the grant and lease, land use permits, or agency regulations. Rather, the compliance issues related to the broadly

worded grant and lease sections and provisions. Further, most of the “problems” were inside the fences of the pump stations and the terminal rather than along the pipeline where JPO had previously concentrated. Similarly, few of these deficiencies were environmental or involved the oil spill contingency plan, that are two major areas of JPO emphasis.

Significant audit action items identified by audits conducted by Quality Technology Company, Inc., and Arthur D. Little were found to be recurring in some projects: 1) National Electrical Code violations for the installation of some electrical components of the Marine Tanker Loading Vapor Control project at the Valdez Marine Terminal; 2) use of untraceable project materials; 3) supplies and materials not receiving quality inspections; and 4) improper inspector certification, an item that has subsequently been resolved and closed.

Alyeska appears to have problems with the recurrence of some audit action items. Through ongoing surveillance, JPO will continue to closely monitor how Alyeska resolves these recurring audit action items. Future CMP reports will document Alyeska's improvement or continued problems. JPO found these audit action items identified by past audits were recurring during some Alyeska projects in 1997:

National Electrical Code violations.

As previously discussed in Chapter 3, the Alaska State Department of Labor (ADOL) issued 124 National Electrical Code notices of violation to Alyeska's contractor for the electrical installation work at berths 4 and 5 of the Marine Tanker Loading Vapor Control System at the Valdez Marine Terminal. ADOL felt that some components of the project's electrical work did not comply with the National Electrical Code. Alyeska has indicated this is being resolved.

Use of untraceable materials.

Materials used for the pipe sleeve on the Thompson Pass Corrosion Investigation project were untraceable, that is, quality control procurement documentation could not be found for already stocked materials. This posed questions about the quality of materials used for critical components on the project.

Inadequate receiving inspections of construction materials.

This was a finding discussed in JPO's *Vapor Recovery and Vapor Control* assessment report that noted the inspections for received materials were not thorough and sometimes not completed.

Improper qualification and certification of inspection personnel.

This was a finding identified in JPO's *Mainline Pipe Investigation Project at Thompson Pass* assessment report. Procedures for the qualification and certification of inspection personnel were not established or being followed. Alyeska resolved this situation and JPO verified and closed the finding.

Chapter 5. Future JPO Work Commitment

JPO will continue to monitor and evaluate Alyeska's projects for future CMP reports, based on Alyeska's project activities.

New Contractor Compliance

The Alyeska Alliance contractors, *Price Ahtna* and *Alaska Petroleum Contractors* were replaced with a new Alyeska Alliance contractor, *Houston Nana*. For future projects, JPO will assess whether the new contractor's procedures are in compliance with approved plans, associated permits, the Federal Agreement and Grant and State Lease of Right-of-Way.

1998 TAPS Projects

JPO will closely monitor several projects scheduled for 1998:

- Installation of impressed current cathodic protection.
- Investigation and repair of buried check valves.
- Continued investigation of mainline corrosion.
- Repair of tank farm liner boots.
 - Investigation of remote gate valve propane tank corrosion.
- Installation of check valve operators.
- Replacement of Remote Gate Control Valve (RGV-80).
- Repairs of Check Valve 122.

JPO Oversight For 1998

JPO will continue to closely monitor Alyeska's compliance with the stipulations of the Federal Grant and State Lease for project performance. JPO will conduct follow-up surveillance for 1997 projects, as well as surveillance of new projects for 1998.

Thompson Pass Permanent Back Pressure Valve Installation. This 1997 project involved the installation of specially designed valves at the Valdez Marine Terminal to regulate the back pressure in the pipeline. A slack line condition in the Thompson Pass area caused frequent pressure pulsations in the pipeline, as a result of less oil throughput traveling through steep slope conditions at Thompson Pass. The frequent oil pressure surges caused vibrations that became a concern for adjacent property owners and put pipeline integrity in question. Alyeska did a detailed pipeline integrity analysis on the pipe in the Thompson Pass area and decided that the way to prevent the pressure surges was to install extra control valves in the East Metering Building at the Valdez Marine Terminal to regulate the back pressure in the pipeline.

However, JPO's assessment of this project has been delayed, pending the receipt of necessary information. JPO has not yet received the project closeout package from Alyeska, as specified by PM 2001, Alyeska's Engineering Execution Manual. Once the information is received and reviewed, JPO will complete and release the assessment report for this project.

JPO plans to:

New Contractor Compliance.monitor future projects to assess whether the new Alyeska contractor and contract procedures are in compliance with approved plans, designs and regulatory requirements.

Quality Control: Electrical Inspection Oversight.assess whether personnel are verifying electrical inspections on projects involving electrical installation.

Monitoring Rods.review Alyeska's final test report concerning the use of 25-gram thermitite charges for welding monitoring rods to the pipeline, when Alyeska sends the report to JPO.

Project Planning.evaluate the adequacy of future project planning to ensure that planning is complete and construction packages are not prematurely released, then modified during project implementation.

Non-Conformance Reports.evaluate non-conformance reports to assess whether they are being used correctly for Alyeska projects at the Valdez Marine Terminal.

Pump Station 6 Reverberations.evaluate the Pump Station 6 reverberation incident. JPO determined no damage occurred to the pipeline during this event. However, this incident will be evaluated from an operations standpoint in the CMP Operations Report, scheduled for release later in 1998.

Closing Summary

The conclusions drawn in this report should not surprise those experienced in watching the 20 year history of TAPS. As stated in the beginning of this report, JPO believes the pipeline system, workers and the environment remained safe, but project planning, execution processes and some quality controls demonstrated a need for improvement. JPO is convinced that better planning, more thorough inspection, quality program training and stronger quality assurance would have prevented most of the issues cited in this report. JPO will continue to closely monitor Alyeska's compliance with the stipulations of the Federal Grant and State Lease.

One of the purposes of these CMP reports is to follow the trending process in anticipation of Federal Grant and State Lease renewal for TAPS in 2004. However, if JPO oversights of future projects reveal further electrical violations, poor project planning or slow responses to employee concerns, this will indicate a trend that will need resolution.